



Mapped, edited, and published by the Geological Survey  
Control by USGS and USC&GS  
Topography by photogrammetric methods from aerial  
photographs taken 1969. Field checked 1969.  
Polyconic projection. 1927 North American datum.  
10,000 foot grid based on Pennsylvania coordinate system, north zone.  
1000-meter Universal Transverse Mercator grid ticks,  
zone 17.

Only selected wells are shown in oil fields. Numerous wells omitted.

Landslides and related features interpreted  
from aerial photographs:

1:78,000 (black and white) 1977

Photointerpretation and field check 1978-1979  
This map has not been edited or reviewed  
for conformity with Geological Survey  
standards and nomenclature.

**ACTIVE OR RECENTLY ACTIVE LANDSLIDE**  
Complex landslide composed of earthflow, debris  
slide, earth and rock slump. Identified from  
historical records, and from scars, debris and  
other field evidence. Ground extremely unstable;  
sliding accelerated by excavation, loading and  
changes in drainage conditions. May include  
areas with several active slides too small to  
be shown separately. Questioned where doubtful.  
May be shown with symbol (A) where difficult to discern.

**OLD LANDSLIDE**  
Area of extensive hummocky ground caused by  
earthflow and earth and rock slump. Lacks  
clear evidence of active sliding. Relatively  
stable in natural, undisturbed state,  
generally not affected by small structures properly  
sited in areas away from the edge of the toe;  
can be reactivated by extensive, rapid excava-  
tion, loading, and changes in ground water and  
surface water conditions. Area of old landslide  
probably includes recent ones not identified  
from field evidence or otherwise documented.  
Upslope boundary of landslide generally defined  
by modified scarp, but downslope (toe) may be  
gradational and not well defined. Questioned  
where doubtful.

**COLLUVIAL SLOPE**  
Valley wall along major streams with slope as  
steep as 40° (85%); stony, clayey silt soil up  
to 50 ft. (15 m) thick; commonly buttressed by  
a terrace or bench at the toe of the slope; very  
susceptible to sliding by cutting of toe area,  
removal of terrace or bench, and overloading;  
slide commonly activated without apparent cause.

## LANDSLIDES AND RELATED FEATURES

OF THE LEWIS RUN, PA. QUADRANGLE

by  
John S. Pomeroy  
1981

U.S. Geological Survey  
OPEN FILE MAP 81-238 (6-11)

**AREAS SUSCEPTIBLE TO DEBRIS FLOWS AND DEBRIS  
AVALANCHES**  
Primarily shallow, narrow ravines and chutes with  
accumulation of stony colluvium generally 10 ft.  
(3 m) or less in thickness; susceptible to rapid  
movement during intense rainfall. Most ravines  
and chutes designated show evidence of former  
debris flows and avalanches. Symbol A design-  
ates historical debris flow or debris avalanche.

**AREAS SUSCEPTIBLE TO ROCKFALL**  
Steep, locally vertical, natural and man-made  
slopes and cliffs, 15 ft. (4.5 m) or more high;  
formed dominantly of sandstone, limestone, sandy  
shale, mudstone and claystone. Interbedded mud-  
stone, claystone and shale weather rapidly leaving  
sandstone and limestone rock faces unsupported.

**SOIL AND ROCK SUSCEPTIBLE TO LANDSLIDING**  
Soil and rock similar to that involved in land-  
slides elsewhere in map area; primarily areas  
underlain by claystone, mudstone and shale  
associated with other rock types. Rock weathers  
rapidly on exposure forming clayey soil highly  
susceptible to sliding. Includes coves (U-shaped,  
shallow valleys) containing thick layers of clayey  
soil that are very susceptible to sliding where  
excavation breaks continuity of slope and where  
overloaded by artificial fill.

### AREAS LEAST PRONE TO LANDSLIDES

Map areas in which no patterns or symbols are shown;  
primarily valley floors, ridge tops and broad  
benches; modification by excavation and fill may  
lead to local landslides.  
Includes slopes where landslides are sparse.

The first five digits of the open file number designate the  
specific 1:250,000 scale map sheet of which this quadrangle  
is a part. The last two digits designate the position of the  
quadrangle in a subdivision of the 1:250,000 scale map based  
on rows and tiers shown in the diagram to the right. The  
location of this quadrangle is shown by the black square.

**ROAD CLASSIFICATION**  
Primary highway  
hard surface  
Secondary highway  
hard surface  
Light duty road, hard or  
improved surface  
Unimproved road  
Interstate Route  
U.S. Route  
State Route

LEWIS RUN, PA.  
SWA BRADFORD 15 QUADRANGLE  
N4145 W7837  
1969  
AMS 8067 1 SW 7.5 MINUTE SERIES 1981

**NOTE**  
Information shown is intended as a  
general guide to ground conditions as of  
the date of field check. Additional  
landslides and rockfalls should be anticipated  
in all map units. The map unit depicts  
the dominant condition in the area delineated  
and variations in slope stability may occur  
at any point in the unit. This map is suit-  
able for general planning purposes and as a  
supplement to more detailed studies for site  
selection. The map cannot be used as a sub-  
stitute for detailed geologic and engineering  
investigations to establish design and  
construction criteria of specific sites.  
Some symbols may not appear on this map  
because the description is applicable to a  
series of maps.

**MAN-MADE FEATURES**  
Strip mines (combination of letter symbols  
indicates complex formed of more than one  
type of strip mine)

sh bench with high wall  
sf furrowed with high wall  
sd multiple furrows and multiple benches  
ss hilltop removed  
srg reclaimed by grading  
sru reclaimed by secondary use  
sh/r regraded in part, high wall  
remains

Coal refuse banks  
r identified on aerial photographs;  
not classified in field check

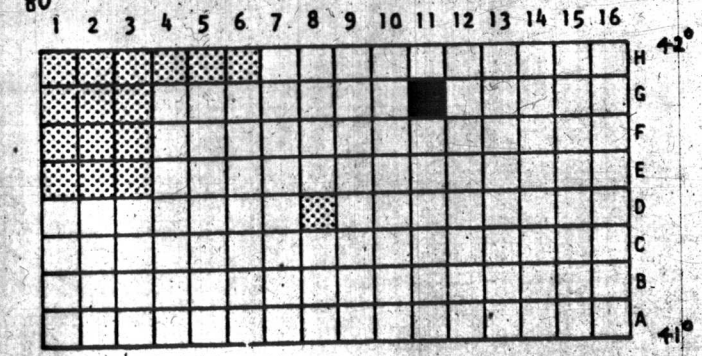
rb not burnt nor on fire  
rbb burnt  
rbd burning  
rbs sludge

Quarries  
q quarry site  
qub spoil bank, quarry waste

Gravel pits  
g site of gravel pit

Slides in man-made features  
af earth flow in fill  
a/s earth flow in strip castings  
a/r earth flow in coal refuse

WARREN 1° X 2° SHEET



Quadrangle does not contain  
landslides or related features.